# Biological Opinion

## Cainhoy Plantation Multi-family Residential and Commercial Development

FWS Log #: 04E2018- CPA-0027

Prepared by:

U.S. Fish and Wildlife Service
South Carolina Field Office
176 Croghan Spur Road, Suite 200
Charleston, SC 29407

Thomas D. McCoy, Field Supervisor

November 15, 2018

Date

TABLE OF CONTENTS

## EXECUTIVE SUMMARY

This Endangered Species Act of 1973 (ESA) Biological Opinion (BO) of the U.S. Fish and Wildlife Service (Service) addresses the proposed Cainhoy Plantation Multi-family Residential and Commercial Development (Action) on behalf of Mr. Peter Lawson-Johnson II, Cainhoy Land & Timber, LLC, Tract I Timber LLC, Seven Sticks, LLC and Tract 7, LLC, (Applicants) Berkeley County, South Carolina. Mr. Lawson-Johnson is applying for a U.S. Army Corps of Engineers (Corps) permit to fill in approximately 187.90 acres of freshwater wetlands and 2.65 acres of estuarine wetlands. Issuance of a Corps permit would allow for the construction of a mixed-use community residences, public schools, retail shops, restaurants, and office space in Berkeley County, South Carolina. The Corps determined that the Action is likely to adversely affect the red-cockaded woodpecker (*Picoides borealis*) (RCW) and Pondberry (*Lindera melissifolia*) and requested formal consultation with the Service. The BO concludes that the Action is not likely to jeopardize the continued existence of these species. This conclusion fulfills the requirements applicable to the Action for completing consultation under §7(a)(2) of the ESA, as amended, with respect to these species and designated critical habitats.

However, per the Service's recommendations, Sabine and Waters conducted surveys for the federally endangered Canby's dropwort (*Oxypolis canbyi*), American chaffseed (*Schwalbea americana*), and pondberry (*Lindera melissifolia*). Surveys were conducted between July 28 - September 22, 2017, and April 2018. Sabine and Waters located pondberry individuals within the Action area. The Service made a site visit on September 22, 2017, and confirmed that there was one pondberry population composed of four subpopulations with the proposed Action area. The total pondberry population consists of approximately 4800-5000 stems. Sabine and Waters worked with the Applicants to increase the size of the Point Hope Nature Sanctuary to include all four pondberry subpopulations. Further, Sabine and Waters noted that the drainage system within the Cainhoy Plantation Action Area will be designed to maintain the major and sub-watersheds ensuring that the hydrological flow patterns continue as existing flow patterns. Based on this recent information, the Service has determined that the effects of this Action on pondberry are *may affect, not likely to adversely affect*.

The Corps also determined that the Action is not likely to adversely affect the northern long-eared bat (*Myotis septentrionalis*), West Indian manatee (*Trichechus manatus*), Bachman's warbler (*Vermivoria bachmanii*), Kirtland's warbler (Setophaga kirtlandii), piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), American wood stork (*Mycteria Americana*), green sea turtle (*Chelonia mydas*), Kemp's ridley sea turtle (*Lepidochelys kempii*), leatherback sea turtle (*Dermochelys coriacea*), loggerhead sea turtle (*Caretta caretta*), frosted flatwoods salamander, (*Ambystoma cingulatum*) American chaffseed, (*Schwalbea americana*) Canby's dropwort (*Oxypolis canbyi*), and seabeach amaranth (*Amaranthus pumilus*) and requested Service concurrence. The Service concurs with these findings. The Service provided our basis for this concurrence by letter dated June 19, 2018. The Corps has determined that the Action may affect the RCW. The Applicants are requesting incidental take for 11 groups of RCWs due to the construction of a mixed-use residential and commercial development.

The BO includes an Incidental Take Statement that requires the Corps to implement reasonable and prudent measures that the Service considers necessary or appropriate to minimize the impacts of anticipated taking on the listed species. Incidental taking of listed species that is compliant with the terms and conditions of this statement is exempted from the prohibitions against taking under the ESA.

Reinitiating consultation is required if the Corps retains discretionary involvement or control over the Action (or is authorized by law) when:

(a) The amount or extent of incidental take is exceeded;

(b) New information reveals that the Action may affect listed species or designated critical habitat in a manner or to an extent not considered in this BO;

(c) The Action is modified in a manner that causes effects to listed species or designated critical habitat not considered in this BO; or

(d) A new species is listed or critical habitat designated that the Action may affect.

## CONSULTATION HISTORY

This section lists key events and correspondence during the course of this consultation. A complete administrative record of this consultation is on file in the Service's South Carolina Field Office (SCFO).

**2013-05-20** - The Service received a letter and White Paper from Sabine & Waters and Ralph Costa (RCWLL) requesting concurrence for the use of RCWs from the Francis Marion National Forest (FMNF) as a translocation donor population for the Cainhoy Habitat Conservation Plan (proposed).

**2013-07-07** - The Service responded to Sabine and Costa concerning the translocation to the ACE Basin.

**2018-04-01** - Interagency site visit to Cainhoy Plantation.

**2018-05-23** -The U.S. Army Corps of Engineers (Corps) initiated formal consultation on the Department of the Army permit (P/N SAC-2018-00319, FWS Log No. 2018-CPA-0027) for the residential and commercial development of Cainhoy Plantation.

**2018-06-18** - The Service met with the Corps at the SCFO to discuss the Cainhoy Plantation development permit application.

**2018-06-19** - The Service responded to inform the Corps that a complete initiation package for P/N SAC-2018-00319, FWS Log No. 2018-CPA-0027 (Cainhoy Plantation) has been received. The Service also concurred for all "not likely to adversely affect" determinations at the time.

**2018-10-18** - The Service requested a 14-day extension for the P/N SAC-2018-00319, FWS Log No. 2018-CPA-0027 BO.

**2018-10-23** - The Service contacted the U.S. Forest Service concerning the potential for fire suppression within the FMNF due to the forthcoming residential development on a property adjacent to them.

**2018-11-01** - The Service received two emails from the U.S. Forest Service regarding the potential for fire suppression on the FMNF due to nearby residential development.

**BIOLOGICAL OPINION**

## 1 INTRODUCTION

A biological opinion (BO) is the document that states the opinion of the U.S. Fish and Wildlife Service (Service) under the Endangered Species Act of 1973, as amended (ESA), as to whether a Federal action is likely to:

- Jeopardize the continued existence of species listed as endangered or threatened; or
- Result in the destruction or adverse modification of designated critical habitat.

Mr. Peter Lawson-Johnson II, Cainhoy Land & Timber, LLC, Tract I Timber LLC, Seven Sticks, LLC and Tract 7, LLC, (Applicants), is requesting a Section 404 Clean Water Act (CWA) permit from the Army Corps of Engineers (Corps) to fill approximately 187.90 acres of freshwater wetlands and 2.65 acres of estuarine wetlands for Multi-family Residential and Commercial Development (Action) on Cainhoy Plantation (Property). This BO considers the effects of the Action on the red-cockaded woodpecker (RCW). The Action does not affect designated critical habitat; therefore, this BO does not address critical habitat.

A BO evaluates the effects of a Federal action along with those resulting from interrelated and interdependent actions, and from non-Federal actions unrelated to the proposed Action (cumulative effects), relative to the status of listed species and the status of designated critical habitat. A Service opinion that concludes a proposed Federal action is not likely to jeopardize species and is not likely to destroy or adversely modify critical habitat fulfills the Federal agency's responsibilities under §7(a)(2) of the ESA.

"Jeopardize the continued existence" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR §402.02). "Destruction or adverse modification" means a direct or indirect alteration that appreciably diminishes the value of designated critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features (50 CFR §402.02).

This BO uses hierarchical numeric section headings. Primary (level-1) sections are labeled sequentially with a single digit (e.g., 2. PROPOSED ACTION). Secondary (level-2) sections within each primary section are labeled with two digits (e.g., 2.1. Action Area), and so on for level-3 sections. The basis of our opinion for the listed species identified in the first paragraph of this introduction is wholly contained in a separate level-1 section that addresses its status, environmental baseline, effects of the Action, cumulative effects, and conclusion.

## 2 PROPOSED ACTION

On behalf of the Applicants, an application was submitted to the Corps for a 50-year, Section 404 CWA permit to discharge fill in approximately 187.90 acres of freshwater wetlands and 2.65 acres of estuarine wetlands for the Action. The Applicants have since revised their request from a 50-year permit to a 30-year permit, (personal communication, Ms. Elizabeth Williams, Corps, November 7, 2018). The proposed Action includes a master-planned, mixed-use residential and commercial development including 18,000 residences, public schools, retail shops, restaurants and commercial buildings on Cainhoy Plantation within the City of Charleston, Berkeley County, South Carolina. The Action as proposed will be developed in a phased construction manner over a 30-year period.

The Applicants have proposed on-site and in-kind measures to offset unavoidable wetland impacts through a Permittee Responsible Mitigation Plan (PRM), which includes the following:

- Protection and enhancement of 585 acres of land, named the Point Hope Nature Sanctuary (PHNS);
- Enhancement of 253 acres of degraded freshwater wetlands;
- Restoration of 6.5 acres of tidally influenced wetlands; and
- Protection and preservation of 2,502 acres of wetlands and 436 acres of upland buffer.

The PRM also includes the protection of a National Forest Green Belt (NFGB), comprised of approximately 55 acres of wetlands and 56 acres of uplands. The NFGB is located on the Property along Cainhoy Road, and adjacent to the Francis Marion Nation Forest (FMNF). In addition, prescribed fire will be used as a management tool on the Property until it has been built-out or in areas such as the PHNS. Prescribed fire will be used to improve wildlife habitat for fire dependent species, control understory vegetation, and inhibit catastrophic wildfires.

This BO considers the environmental changes that the Action is reasonably certain to cause. Our description of the Action throughout section 2 of the BO is based on the Corps Joint Public Notice in coordination with the South Carolina Department of Health and Environmental Control and the Office of Ocean, Coastal Resource Management, and other documents submitted by the Applicants. A determination that the incidental taking associated with implementing the proposed action is not likely to jeopardize the continued existence of species covered under the ITP is a criterion for permit issuance.

The project purpose, as stated by the Applicants, is the construction of a conservation-minded and environmentally sensitive mixed-use development with access to major traffic arteries that has the demographic support, zoning, infrastructure and access to schools and hospitals to help meet the needs of the growing Charleston, South Carolina metropolitan area. This requires a planned community with sufficient land mass to provide for the development of residential, commercial, educational, office, and governmental facilities.

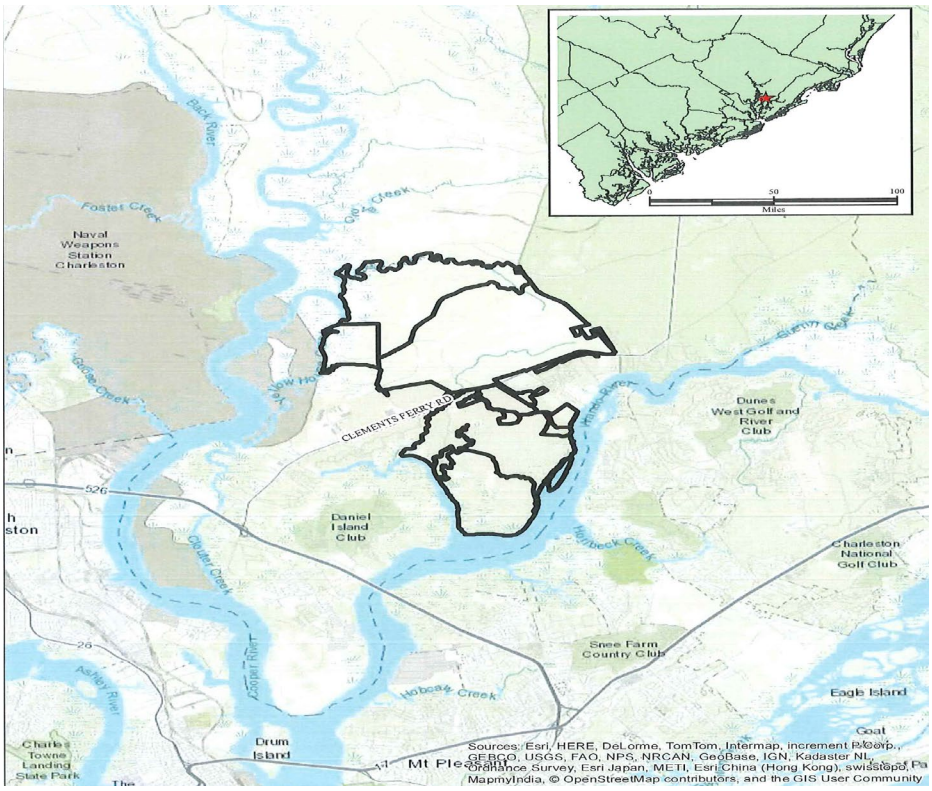



**Figure 1. Location of Cainhoy Plantation (Sabine & Waters, 2017).**

### 2.1 Action Area

For purposes of consultation under ESA §7(a)(2), the Action Area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR §402.02). All areas included in the "Action Area" for this consultation are the Property, the compensatory wetland mitigation areas, two plantations in the ACE Basin, and Hitchcock Woods in Aiken County, South Carolina.

Cainhoy Plantation lies approximately six miles northwest of Mt. Pleasant and six miles east of North Charleston, South Carolina. It is located on both sides of Clements Ferry Road (S-8-33), between Jack Primus Road and Cainhoy Road (S-8-98) and shares a two mile border with the FMNF. Yellow House Creek resides on its western border, and the Wando River on its southern border. Cainhoy Plantation encompasses 9,358 acres.

The areas proposed for compensatory mitigation due to wetland impacts are also included in the Action Area. The Applicants have proposed on-site mitigation in the form of restoration, enhancement, and preservation for impacts to jurisdictional wetlands. These areas, including the 585-acre PHNS, are scattered throughout the Property. Prescribed fire will be used to improve habitat and inhibit catastrophic wildfires.

The Action Area also includes Cheeha Combahee Plantation (Cheeha) and Ashepoo Plantation (Ashepoo) in the Ashepoo Combahee and Edisto Basin (ACE Basin), Colleton County, South Carolina. RCWs were translocated from the FMNF to Cheeha and Ashepoo in the fall of 2014,

2015, 2016, and 2017 to offset potential impacts from a proposed development at Cainhoy. The translocation activity was sponsored by the Applicants to provide "mitigation" for a proposed Habitat Conservation Plan (HCP) for Cainhoy, prior to seeking a section 404 CWA permit. As part of a similar plan, RCWs were also translocated to Hitchcock Woods in Aiken County, South Carolina, in 2016. CCP and Ashepoo encompass approximately 12,000 and 5,130 acres, respectively. Hitchcock Woods contains 2100 acres.

The Action Area is comprised of five land parcels:

1. Cainhoy Plantation;
2. The on-site compensatory mitigation areas;
3. Cheeha Combahee Plantation;
4. Ashepoo Plantation; and
5. Hitchcock Woods.

**2.2 Action Summary**

The Property has been managed for forestry management and private hunting for more than seven decades. Assembled from multiple tracts by Harry F Guggenheim in the 1930's and 1940's, the Property was used as a rural timber farming operation and a hunting/fishing retreat. Cainhoy Plantation has been maintained under careful land stewardship for hunting and forestry. The Property is comprised of approximately 9,375 acres of diverse woodlands, swamps, marshes, and fields, of which, 2,850 acres are longleaf pine (*Pinus palustris*) habitat.
The proposed Action consists of the development of a 9,358-acre property, known as Cainhoy Plantation, and includes a master-planned, mixed-use residential and commercial development. The Action includes 18,000 residences, public schools, industrial park retail shops, restaurants and commercial buildings within the City of Charleston, Berkeley County, South Carolina. The Action as proposed will be developed in a phased construction manner. According to the Biological Assessment, the mixed-use residential and commercial development will be phased in by cutting onsite timber, followed by the clearing, stumping, grubbing and grading of the land to be developed. The construction of infrastructure (roads, water, sewer, etc...) will be next, followed by the manufacturing of buildings (commercial, residential, etc. . .). Because of the extended duration of the project, the Applicants are proposing to have much of the Property remain as a working forest while development needs progress. These areas will continue to be managed for timber and recreational hunting. Native flora and fauna will continue to persist until development occurs.

**2.3 Interrelated and Interdependent Actions**

A BO evaluates the effects of a proposed Federal action. For purposes of consultation under ESA §7(a)(2), the effects of a Federal action on listed species or critical habitat include the direct and indirect effects of the action, plus the effects of interrelated or interdependent actions. "Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration" (50 CFR §402.02).

The Service is concerned that the proposed Action may have an adverse effect on the U.S. Forest Service's (USFS) prescribed fire program at the FMNF. Land use changes occurring next to the FMNF may drastically affect the ability of the FMNF to use prescribed fire with sufficient frequency and intensity to sustain federally protected species. These federally protected species and their habitat may be negatively impacted by the proposed development via fire suppression. An increase in human activity may suppress fire return intervals, altering the composition and structure of this fire-dependent ecosystem and resulting in habitat degradation.

The Service initially contacted the USFS regarding the issue of fire suppression on August 7, 2018. Certain solutions may be available to address this issue such as burning every 2-3 years to keep fuel loads down and burning smaller blocks for efficiency. The Applicants have also offered to place smoke easements on their Property to address the issue of fire and smoke dispersal. However, while the issue of prescribed fire is complex, it remains unforeseen that a reduction in fire frequency on the FMNF is reasonably certain to occur.

## 3 CONCURRENCE

The Corps determined that the Action is not likely to adversely affect the northern long-eared bat (*Myotis septentrionalis*), West Indian manatee (*Trichechus manatus*), Bachman's warbler (*Vermivoria bachmanii*) , Kirtland's warbler (*Setophaga kirtlandii*), piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), American wood stork (*Mycteria Americana*), green sea turtle (*Chelonia mydas*), Kemp's ridley sea turtle (*Lepidochelys kempii*), leatherback sea turtle (*Dermochelys coriacea*), loggerhead sea turtle (*Caretta caretta*), frosted flatwoods salamander (*Ambystoma cingulatum*), American chaffseed (*Schwalbea americana*), Canby's dropwort (Oxypolis canbyi), and seabeach amaranth (*Amaranthus pumilus*). The Service concurs with these findings, for reasons we explain in this section (Table 1).

**Table 1. Species Evaluated for Effects from the Action**

| SPECIES OR CRITICAL HABITAT | PRESENT IN ACTION AREA | PRESENT IN ACTION AREA BUT "NOT LIKELY TO BE ADVERSELY AFFECTED" BASED ON |
|---|---|---|
| Northern Long-eared bat | Possible | Available habitat in the PHNS |
| West Indian Manatee | No | |
| Bachman's Warbler | No | |
| Kirtland's Warbler | Not reported since 1984 | |
| Piping Plover | Possible in migration | Habitat available in PHNS |
| Red Knot | No | |
| Wood Stork | No | Foraging habitat available; no rookeries |
| Green Sea Turtle | Yes | |
| Kemp's Ridley Sea Turtle | No | |
| Leatherback Sea Turtle | No | |
| Loggerhead Sea Turtle | No | |
| Frosted Flatwoods Salamander | No | |
| American Chaffseed | No | |
| Canby's Dropwort | No | |
| Seabeach Amaranth | No | |

This concurrence concludes consultation for the listed species and designated critical habitats named in this section, and these are not further addressed in this BO. The circumstances described in the Reinitiation Notice of this BO that require reinitiating consultation for the Action, except for exceeding the amount or extent of incidental take, also apply to these species and critical habitats.

## 4 RED-COCKADED WOODPECKER

The Service identified the red-cockaded woodpecker (*Picoides borealis*) as a rare and endangered species in 1968 and officially listed it as endangered in 1970 (35 FR 13519). No critical habitat has been designated for the RCW. In addition, a 5-year review found no change to the status of the species (Service 2006) (70 FR 53807). Currently, the species is undergoing another 5-year status review (Service 2018) (83 FR 38320). A complete discussion of the status of the species in South Carolina and throughout its range can be found in the Service's Revised Recovery Plan (Recovery Plan, Service 2003). These documents are incorporated here by reference.

### 4.1 Status of the Species

This section summarizes best available data about the biology and current condition of RCW throughout its range that are relevant to formulating an opinion about the Action. The Service published its decision to list the RCW as endangered on 8/25/1970 (35 FR 16047).

#### 4.1.1 Species Description

The common name for the RCW came into use during the early 1800's when "Cockade" was regularly used to refer to a ribbon or other ornament worn on a hat. Female RCWs lack the red cockade. RCWs are small and have black and white barred wings and back. The RCWs also have a distinctive white patch on their cheek, unlike any other woodpecker in the southeast.

#### 4.1.2 Life History

The RCW has an advanced social system that revolves around family groups. A typical RCW group includes one pair of breeding birds, the current year's offspring (if any), and zero to four "helpers." Helpers are usually male offspring from previous breeding seasons that assist the breeding pair by incubating eggs, feeding the young, excavating cavities, and defending the territory (Ligon 1970; Lennartz and Harlow 1979; Lennartz *et al.* 1987; Walters *et al.* 1988). The RCW nesting season occurs from April to July. Incubation lasts approximately 9-10 days, and the young fledge 24- 26 days after hatching. Some juvenile males disperse from their natal territory prior to the next breeding season in an attempt to find vacant territories, or to establish their own (Hooper *et al.* 1980; Recovery Plan Service 2003). Others may remain and become helpers during subsequent nesting seasons. Most juvenile females disperse after fledging, although some may remain with the group as helpers (Walters *et al.* 1988). The average dispersal distance of fledgling males and females is about three miles (Walters 1991; Letcher *et al.* 1998). RCWs exhibit relatively low adult mortality rates; annual survivorship of breeding males and females is high, ranging from 72 to 84% and 51 to 81%, respectively (Lennartz and Heckel 1987; Walters *et al.* 1988; DeLotelle and Epting 1992). In North Carolina, survival rates of RCWs fall to around 50% beginning at age 9 in females and age 11 in males (Walters *et al.* 1988).

Each group of RCWs occupies a discrete territory consisting of its cavity trees, called a "cluster," and adjacent foraging habitat (Walters 1990). The RCW requires mature (usually

60 or more years old) live pine trees to excavate its nesting and roosting cavities. The cavity trees are essential to the RCW because they provide shelter and a place to nest and raise young (Ligon 1970). A typical cluster contains 1-20 cavity trees, and the breeding male usually chooses the best, most recently excavated natural cavity as the nest tree, or selects cavity trees with higher resin yields (Conner and Rudolph 1989). Such cavity trees may enhance the survival of the nestlings by decreasing the parasite load of nestlings and incubating adults, and providing a resin barrier to reduce snake or other predation. Once established, clusters are often utilized for many consecutive years or even decades, largely passed down from one generation to the next (Walters 1990). Hardwood encroachment into the midstory lessens the habitat quality, eventually leading to cavity abandonment when the hardwood midstory reaches cavity height (Conner and O'Halloran 1987; Costa and Escano 1989). Cluster abandonment may also occur as a result of displacement by competing cavity dwellers, or meteorological events such as hurricanes (Conner and O'Halloran 1987).

### 4.1.3 Numbers, Reproduction, and Distribution

The RCW was listed as endangered due to documented declines in local populations and massive reduction in foraging and nesting habitat. The life history of RCWs is closely tied to the occurrence of fire-maintained old growth pine forests that once dominated the southeastern United States. Only 3 million acres of longleaf pine forest remain of the estimated 60 to 92 million acres once in existence (Frost 1993). The history of timber harvesting for agriculture, short timber rotations, and the suppression of fire reduced the amount and quality of RCW foraging and nesting habitat.

At the time of listing, the total number of individuals had declined to less than 10,000 in widely scattered and isolated populations (Recovery Plan, Service 2003). Most RCW populations, regardless of location or land ownership, were considered stable at best, but more likely declining (Costa 1995). Costa and Escano (1989) documented RCW population declines in at least 10, and perhaps as many as 17 populations on National Forests. James (1995) estimated that the number of active clusters range-wide declined 23 percent between the early 1980s and 1990. Since the early 1990s, numerous RCW populations have increased, particularly on Federal lands, as a result of management activities.

In 2003, it was estimated that 14,068 RCWs inhabited 5,627 active clusters across 11 States in the southeast United States (Recovery Plan, Service 2003). National Forests, military installations, and National Wildlife Refuges contain the majority of extant populations and most of the habitat that is potentially suitable for RCWs. Conservation of RCWs as a species will depend on prudent management of habitats on those Federal lands. National Forests support the majority of the core populations required for recovery of the species, and therefore, have a uniquely important role in the species' recovery. Prior to the 1980s, most populations on National Forests were declining, but management efforts during the past several decades, especially prescribed burning and cavity management, stabilized most of those populations and led to increases in some (Recovery Plan, Service 2003). As of January 2006, 6,105 active clusters across 11 States were reported (Service 2006).

Recovery is progressing. Core populations are continuing to increase, and there have been substantial enrollment in the Safe Harbor Program (SHP) protecting RCWs on private lands. The recovery of the RCW is directly linked to the viability of discrete populations within selected southeastern states (Service 2003). Populations required for recovery are distributed among 11 recovery units based on physiographic region to ensure the representation of broad geographic and genetic variation in the species. Viable populations within each recovery unit, to the extent allowed by habitat limitations, are essential to recovery of the species as a whole. Until the 1990s, most RCW populations were considered stable at best, or declining. However, RCW population trends since the early 1990s are improving, with an estimated 6,105 active RCW clusters range-wide (Service 2006). The species will be considered recovered and removed from the Endangered Species list when five criteria are met. The criteria establish a tier of populations within the 11 recovery units that contain sufficient suitable nesting and foraging habitat and are not dependent on the installation of artificial cavities to remain stable.

Long-term viability of an RCW population, in genetic terms, depends on the presence of an adequate number of breeding individuals for the natural processes that increase genetic variability (e.g., mutation and recombination) to offset the natural processes that decrease genetic variability (e.g., genetic drift and inbreeding). Additionally, any prediction of a population's viability should also consider the population's ability to survive population fluctuations due to demographic and environmental fluctuations (Koenig 1988) or natural catastrophes.

Reproductive rates, population density, and recolonization rates may influence RCW population variability more than mortality rates, sex ratios, and genetic viability. Therefore, dispersal of adult birds to assume breeding roles in vacant clusters is essential for population persistence (Daniels *et al.* 2000; Schiegg *et al.* 2002).

Although the relationship between RCW population variability and density is not well understood, recent studies indicate spatial distribution of territories is important in long-term population stability. Conner and Rudolph (1991) found that, in sparse populations, RCW group size and the number of active clusters decreased as fragmentation increased. Hooper and Lennartz (1995) suggested that populations with less than 4.7 active clusters within 1.25 miles on average had critically low densities that inhibited population expansion. Results from a spatially explicit simulation model of RCW population dynamics suggest that population growth rate may depend more on the number and spatial distribution of territories, than on the initial composition of the population (Letcher *et al.* 1998). Achieving a self-sustaining population required fivefold more territories when territories were randomly spaced than when they were maximally clumped, and populations with as few as 49 territories were stable when those territories were highly aggregated. Populations of more maximally aggregated groups are likely to persist over the short term (i.e., 20 years) (Crowder *et al.* 1998).

Natural population growth (i.e., without recruitment clusters) occurs at extremely low rates (one to two percent per year) in this species (Walters 1991), and the availability of cavity trees is limiting (Copeyon 1990; Allen 1991). New groups or new territories arise by two

processes, pioneering and budding (Hooper 1983). Pioneering is the occupation of vacant habitat by construction of a new cavity tree cluster and is relatively rare. Budding is the splitting of a territory, and the cavity tree cluster within it, into two. Budding is more common than pioneering in RCWs, since the new territory contains cavities from the outset (Recovery Plan, Service 2003).

Inactive clusters are important to maintaining extant populations of RCWs and may provide a short-term opportunity to enhance habitat available to RCWs, and thus increase the number of groups in populations (Doerr *et al.* 1989). After a territory is abandoned for two or more years, it is almost never reoccupied. This abandonment is typically because cavities are unsuitable due to deterioration or hardwood encroachment (Beckett 1971; Conner and Locke 1982; Copeyon *et al.* 1991).

The technology to induce new territories at desired locations exists and management for optimum territory clumping is, therefore, possible (Letcher *et al.* 1998). Artificial cavities can be installed in unoccupied habitat that is otherwise suitable (Copeyon 1990; Allen 1991), and these cavities typically become subsequently occupied by dispersing subadult birds (Carrie *et al.* 1999; Conner *et al.* 1999). Adding artificial cavities to sites already occupied increases group size (Carrie *et al.* 1999). Artificial cavities provide additional roosting opportunities for subadult males, encouraging them to remain in their natal clusters and potentially inherit the territory (Carrie *et al.* 1999). Females may also benefit when additional cavities are provided because they are the most subordinate members of the RCW social group, and therefore, may not always be able to secure adequate roost cavities.

Inducing the formation of RCW groups in restored habitat with artificial cavities is an established and successful technique (Copeyon *et al.* 1991; Walters *et al.* 1992; Gaines *et al.* 1995; Watson *et al.* 1995). Within one year of restoring habitat and providing artificial cavities at 20 unoccupied territories in the Sandhills of North Carolina, 90 percent of the sites were occupied by RCWs (Copeyon *et al.* 1991). Translocating RCWs is another method successfully used to establish new groups (Rudolph *et al.* 1992; Allen *et al.* 1993; Hess and Costa 1995; Costa and Kennedy 1994; Franzreb 1999). Translocation can include augmenting a solitary-bird group or translocating a pair of subadult RCWs [i.e., unrelated male and female (Costa and Kennedy 1994)]. Franzreb (1999) found that 63.2 percent of translocated birds (including adults and juveniles) remained at the release site for at least 30 days and 51.0 percent reproduced.

At the time of listing, the total number of individuals had declined to less than 10,000 in widely scattered and isolated populations (Recovery Plan, Service 2003). Most RCW populations, regardless of location or land ownership, were considered stable at best, but more likely declining (Costa 1995). Costa and Escano (1989) documented RCW population declines in at least 10, and perhaps as many as 17 populations on National Forests. James (1995) estimated that the number of active clusters range-wide declined 23 percent between the early 1980s and 1990. Since the early 1990s, numerous RCW populations have increased, particularly on Federal lands, as a result of management activities.

**Conservation Needs and Threats**

Recovery criteria identified as necessary to remove the RCW from ESA protection are found in the Recovery Plan (Service 2003, pages 140-161) and 5-year review (Service 2006). Pertinent to this proposed action, Criterion 1 within the Recovery Plan (Service 2003) requires that 12 populations of RCWs each contain at least 350 PBGs, and one population to contain 1000 PBGs from among 13 designated primary core populations. In addition, each of these 13 populations is not to be dependent on continuing installation of artificial cavities to remain at or above this population size.

Summarizing from the Recovery Plan (Service 2003), research has expanded our understanding of the foraging ecology of RCWs considerably but not perfectly (as described above). The Recovery Plan provides two sets of guidelines for the management of foraging habitat: 1) the recovery standard; and 2) the standard for managed stability. The recovery standard (see pages 188-189 in Recovery Plan) defines "good quality foraging habitat" and is a description of the desired future condition of RCW foraging habitat on any properties involved in species recovery. Many RCW territories do not currently meet this standard. The recovery standard, when applied forest-wide, will provide the landscape that is considered necessary to achieve recovery within individual populations. The recovery standard, however, is not used to evaluate the anticipated level of incidental take related to project impacts on foraging habitat.

The managed stability standard (see pages 292-294, Appendix 5 in the Recovery Plan) is to be used for instances in which a landowner cannot manage to the recovery standard and defines the minimum foraging habitat requirements considered necessary to avoid foraging habitat-related incidental take (Service Memo; May 2005). That is, it identifies the quantity and quality of foraging habitat necessary for a breeding group to: (a) survive and, (b) reproduce, based on foraging habitat alone. Wide-scale (population or property-level) implementation or application of the managed stability standard will not allow us to achieve recovery of the species because it will fail, over the long-term, to: 1) ensure adequate nesting habitat or good quality foraging habitat, 2) prevent population fragmentation with subsequent problems related to demographic stochasticity and perhaps genetic variability, and 3) support a population's long-term survival or ability to achieve recovery.

**Climate change**

The varying and dynamic elements of climate change are inherently long term, complex and interrelated. Although we may anticipate the direction of change, it may not be possible to predict precise timing or magnitude. These impacts may take place gradually or episodically in major leaps.

According to the Intergovernmental Panel on Climate Change Reports (IPCC 2007, 2013), warming of the earth's climate is "unequivocal," as is now evident from observations of increases in average global air and ocean temperatures, widespread melting of snow and ice, and rising sea level. The IPCC Report (2007) describes changes in natural ecosystems with

potential widespread effects on many organisms, including marine mammals and migratory birds.

Scientific evidence indicates a rapid and abrupt climate change, rather than the gradual changes that have been currently forecasted (IPCC Report 2007), posing a significant challenge for fish, wildlife, and plant conservation. Species' abundance and distribution are dynamic, relative to a variety of factors, including climate. As climate changes, the abundance, and distribution of fish and wildlife will also change. Highly specialized or endemic species are likely to be most susceptible to the stresses of changing climate. Based on these findings and other similar studies, the Service will incorporate potential climate change effects as part of their long-range planning activities (Service 2009a; 2009b).

Climate change at the global level drives changes in weather at the regional level, although weather is also strongly affected by season and by local effects (e.g., elevation, topography, latitude, proximity to the ocean). Temperatures are predicted to rise from 2°C to 5°C for North America by the end of this century (IPCC 2007). Other processes to be affected by this projected warming include rainfall (amount, seasonal timing, and distribution), storms (frequency and intensity), and sea level. The 2007 IPCC report found a 90 percent probability of 7 to 23 inches of sea level rise by 2100. The exact magnitude, direction, and distribution of these changes at the regional level are not well understood or easy to predict. Seasonal change and local geography make prediction of the effects of climate change at any location variable. Current models project a wide range of regional changes, but generally project the interior southeast to be drier and coastal areas to be wetter.

Significant threats to RCW populations that may be exacerbated by climate change are increased numbers and intensity of hurricanes (Emanuel 2005; Webster et al. 2005) and increased episodes and duration of drought events. Drought events can increase the likelihood of insect outbreaks (i.e. southern pine beetle). Hurricanes can significantly reduce a RCW population by impacts to cavity trees and by damage to forest stability and structure, both important to RCWs that may require years to recover.

A complete discussion of the threats to the RCW is contained in the Service's Recovery Plan (Recovery Plan, Service 2003, pages 140-161) and 5-year status review (Service 2006). A succinct summary from the 5-year review (Service 2006) states the primary threats to species viability for RCWs all have the same basic cause, lack of suitable habitat. These threats included: 1) insufficient numbers of cavities and continuing net loss of cavity trees, 2) habitat fragmentation and its effects on genetic variation, dispersal, and demography, and 3) lack of foraging habitat of adequate quality. Other associated threats to species viability for RCWs include range-wide population isolation, within population isolation (i.e., isolation of clusters), and genetic and demographic threats to viability inherent to small populations discussed above.

### 4.2 Environmental Baseline

This section is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the RCW, its habitat, and ecosystem within the Action Area. The

environmental baseline is a "snapshot" of the species' health in the Action Area at the time of the consultation, and does not include the effects of the Action under review.

### 4.2.1 Action Area Numbers, Reproduction, and Distribution of RCW

**Cainhoy Plantation**

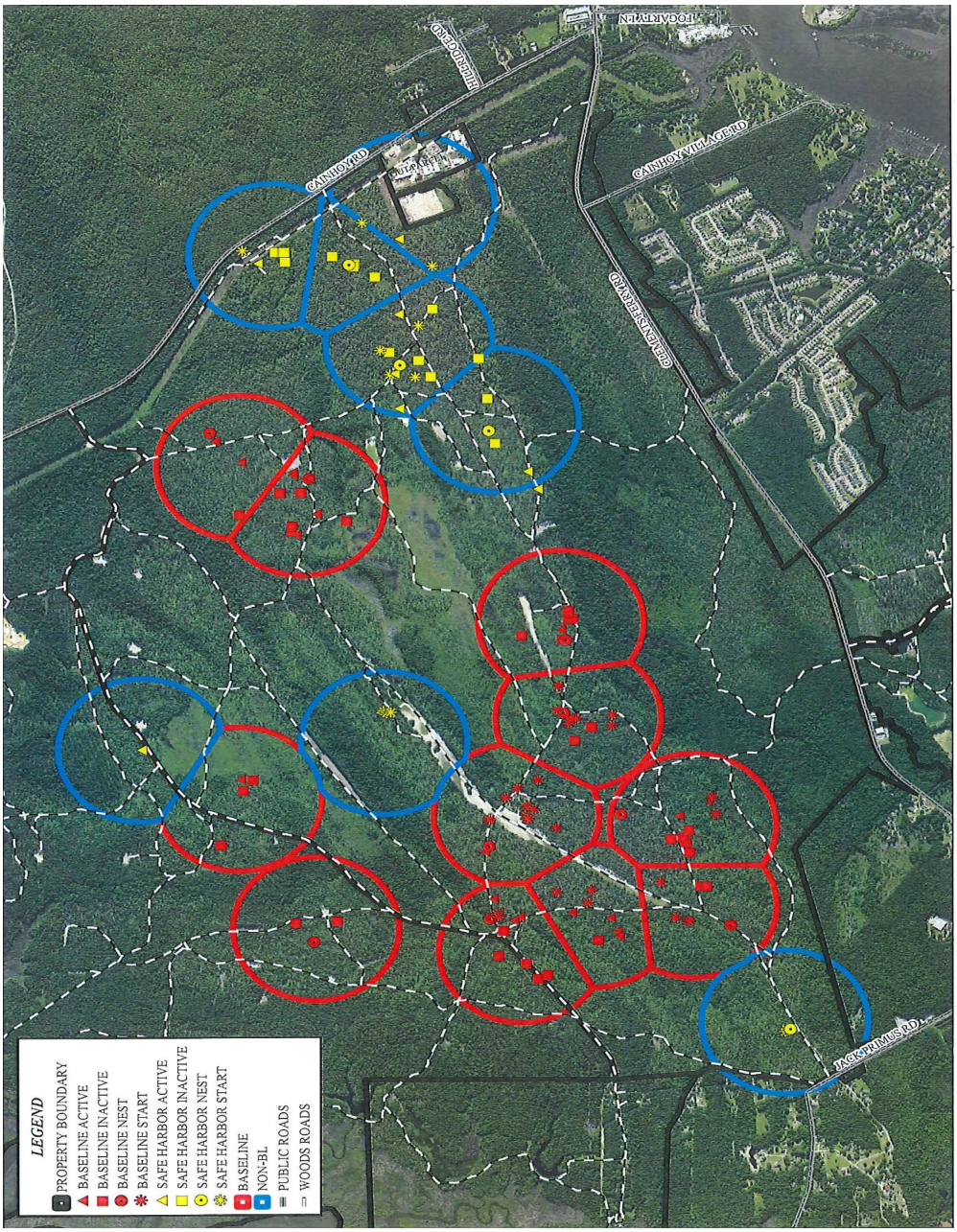
Cainhoy Plantation has been enrolled in the RCW Safe Harbor Program (SHP) with the South Carolina Department of Natural Resources (SCDNR) since 1999. Currently, Cainhoy has a total of 19 RCW groups made up of 11 baseline groups and 8 above-baseline groups (**Figure 2**). All of the 11 baseline groups at Cainhoy Plantation are comprised of naturally excavated cavities. Six of the above-baseline groups are also naturally excavated cavities and the remaining two above-baseline groups utilize artificial cavity inserts that were installed by the Applicants. The Applicants are asking for incidental take for the 11 baseline groups.

The RCW groups at Cainhoy Plantation are demographically connected to the FMNF, Bonneau Ferry Wildlife Management Area (WMA), and Santee Coastal Reserve WMA (**Figure 3**). The FMNF is one of two Primary Core Populations of the Mid-Atlantic Coastal Plain Region. This population supports the third largest population of the federally endangered RCW in the U.S. and is one of 13 designated core recovery populations. In 1989, Hurricane Hugo wiped out an estimated 63 percent of the RCW population, destroyed 87 percent of the cavity trees, and significantly reduced the RCW population in the FMNF from 480 active territories to 384. Due to extensive habitat management including artificial cavity installation and continued cavity and habitat management, the population has steadily increased over time. In 2007, the FMNF RCW population exceeded the recovery goal of 350 PBGs as described in the RCW Recovery Plan (Service 2003). Currently, the RCW population in the FMNF is 488 PBGs.

The SCDNR manages both Bonneau Ferry WMA and Santee Coastal Reserve. Bonneau Ferry WMA, with 16 active RCW groups, covers 10,700 acres of pine savannahs, bottomland hardwoods, wildlife openings, wetlands, and reservoirs. Bonneau Ferry WMA is centrally located on the south-west side of Huger off Highway 41.

On the eastern end of the FMNF and across Highway 17, lies a 24,000-acre WMA known as Santee Coastal Reserve. Donated by the Nature Conservancy to SCDNR in 1974, Santee Coastal Reserve WMA consists of two barrier islands, cypress lakes, freshwater wetlands, agricultural fields, and longleaf pine. Santee Coastal Reserve WMA currently has 18 active RCW groups. Other areas that are have occupied habitat within the same demographic area include Amoco Chemicals and Medway Plantation.

**Figure 2. Partitions and cavity trees for baseline and above-baseline RCW groups at Cainhoy Plantation (Sabine & Waters, 2017).**



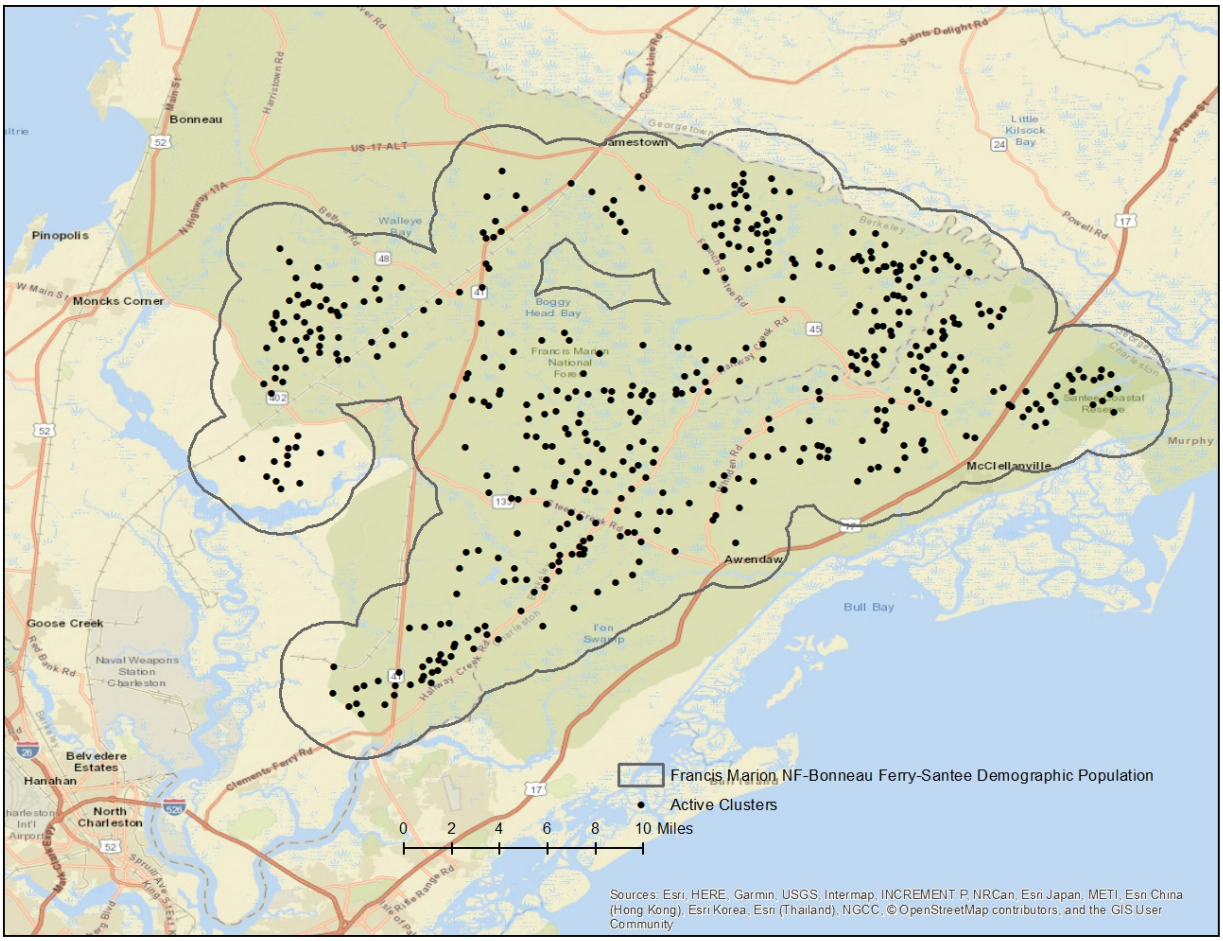



**Figure 3. FMNF-Bonneau Ferry WMA-Santee Reserve WMA RCW demographic population (Service, 2018).**

**Point Hope Nature Sanctuary**

The 585-acre PHNS is located in the northern expanse of the Cainhoy Plantation, north of Clements Ferry Road (Figure 4). It lies along the Cainhoy Scarp, a diverse longleaf pine ecosystem that travels northwest into the FMNF where critical habitat for the frosted flatwoods salamander has been designated. The scarp is considered a marine terrace formation and supports a variety of rare plant and animal species. Approximately 242 acres of pristine, fire maintained longleaf pine upland currently exists within the PHNS and will be preserved and managed to maintain and/or reestablish the longleaf pine ecosystem. In addition, the proposed mitigation plan will provide preservation and enhancement of on-site wetland systems such as cypress/tupelo wetlands, pine savannah, and hardwood forested wetlands.

Currently, three RCW clusters exist within the PHNS and will be protected in perpetuity through a conservation easement held by the Lord Berkeley Conservation Trust. The PHNS is positioned 0.8 miles from the FMNF and within 2 miles of at least 10 RCW clusters. An additional six acres of clearcut natural longleaf upland impacted by previous forestry activities will be restored and enhanced through the routine application of prescribed fire to achieve ideal vegetation composition and densities for RCWs.

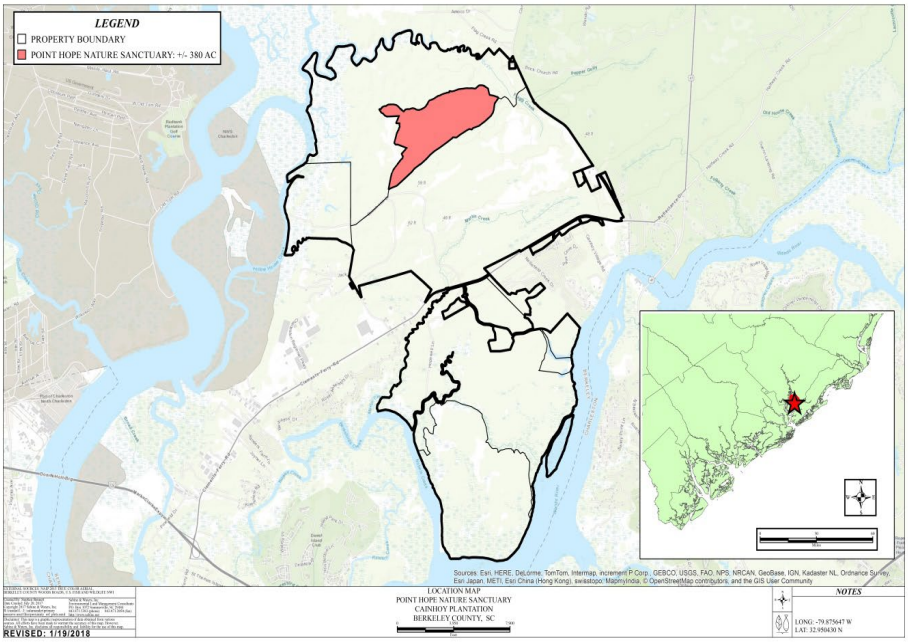



**Figure 4. Location of the proposed PHNS (Sabine & Waters, 2017).**

**ACE Basin and Hitchcock Woods**

Prior to the application for a section 404 CWA permit, the Applicants pursued a Habitat Conservation Plan (HCP) under section 10 of the ESA that would provide the incidental take of 11 baseline RCW groups potentially impacted by future development at Cainhoy Plantation. The Applicants and their consultants designed a multi-year strategy to reintroduce the RCW into the

ACE Basin, Colleton County, South Carolina, as part of the "mitigation" under the proposed HCP. The mitigation would theoretically offset the potential impacts to RCWs from this previously anticipated development. A similar plan was proposed to translocate RCWs to Hitchcock Woods in Aiken County, South Carolina.

Initially, a widespread assessment of properties in the ACE Basin was conducted in an effort to locate potential reintroduction sites. Once Cheeha (Figure 5) and Ashepoo (Figure 6) were identified as prospective locations for RCWs, foraging habitat analyses were conducted to document suitable habitat. Next, high quality cluster centers with pines large enough to accommodate artificial cavity inserts were selected. Next, four artificial cavities per territory were installed. Eventually, pairs of unrelated RCWs were translocated to "recruitment" clusters on Cheeha and Ashepoo.

RCWs were translocated to Cheeha and Ashepoo with funding provided by the Applicants in the fall of 2014 until the fall of 2017. All of the RCW translocations were conducted under a under a section 10(a)(1)(A) permit. As of 2017, Cheeha had eight PBGs and produced 13 fledglings (Table 2). Ashepoo has retained 80% of the five clusters translocated and all four pairs have nested (Table 3). Each of these locations are managed as quail plantations and have been under a 1-2 year prescribed fire return interval for decades. Both Cheeha and Ashepoo plantations are protected in perpetuity through conservation easements with Ducks Unlimited. Dispersals have already been documented between Cheeha and Ashepoo as well as Donnelly WMA, also an introduced population.

Hitchcock Woods is a privately owned, 2100-acre urban forest in the longleaf pine/wiregrass ecosystem of the lower Carolina Sandhills region. RCWs were translocated to this location in the fall of 2016 and again in 2017 by an independent source (Table 4). Currently, Hitchcock Woods has three PBGs and a solitary male group (Figure 7). Prescribed fire, timber management, and the standard for managed stability, as reference above, are all management tools employed at Hitchcock Woods. The closest RCW population to Hitchcock Woods is located on the Savannah River Site, which is 15 miles south of Hitchcock Woods. Dispersals of birds between these locations is low due to fragmented habitat between the two.

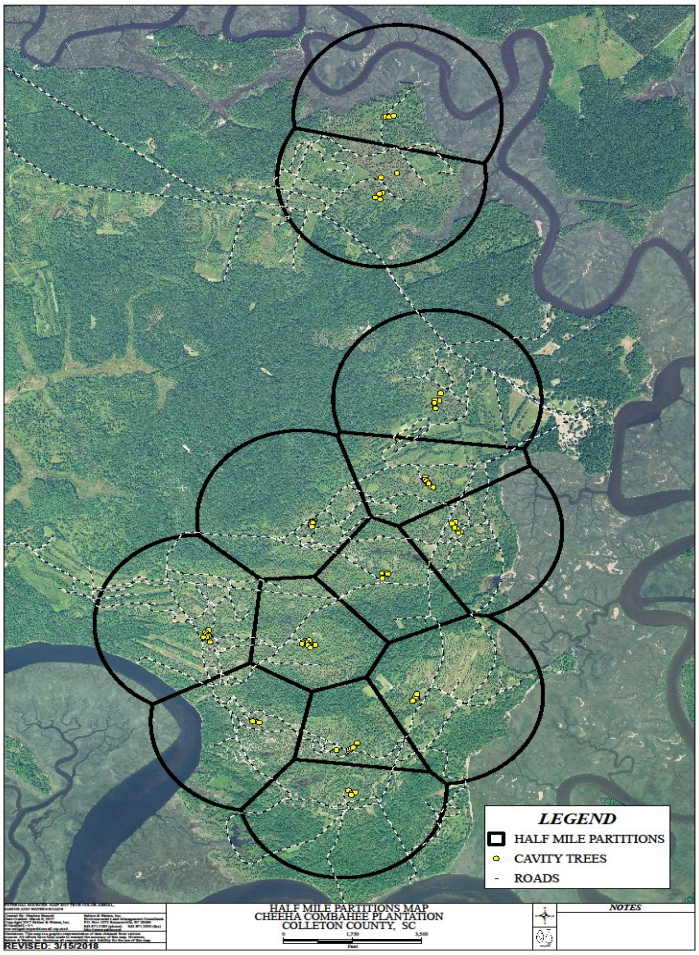



**Figure 5. RCW cavity trees and partitions at Cheeha (Sabine & Waters, 2017)**

**Table 2. Cheeha group status and fledgling production 2015 – 2017 (Sabine & Waters, 2018)**

| Cluster # | Group Status | | | Fledglings | | |
|---|---|---|---|---|---|---|
| | 2015 | 2016 | 2017 | 2015 | 2016 | 2017 |
| 1 | PBG | PBG | PBG | 2 | 3 | 2 |
| 2 | PBG | PBG | PBG | 2 | 1 | 1 |
| 3 | SF | PBG | PBG | 0 | 2 | 2 |
| 4 | PBG | Capt[2] | Capt | 1 | 0 | 0 |
| 5 | PBG | PBG | PBG | 2 | 2 | 0 |
| 6 | PBG | PBG | PBG | 1 | 2 | 2 |
| 7 | Capt | PBG | PBG | 0 | 2 | 2 |
| 8 | U | SM | U | 0 | 0 | 0 |
| 9 | SF | SF | SM | 0 | 2 | 1 |
| 10 | SM | PBG | PBG | 0 | 2 | 1 |
| 11 | SF | SF | U | 0 | 0 | 0 |
| 12 | --- | --- | U | --- | --- | 0 |
| 13 | --- | --- | PBG | --- | --- | 2 |
| Totals | 5 PBG | 7 PBG | 8 PBG | | | |

*Status is determined the first spring (and all ensuing breeding seasons) post-translocation

[1] SF = single female

[2] Capt = captured cluster[1]

[3] U = unoccupied cluster

[4] SM = single male

[5] 2 male nestlings were found dead @ age ~20; likely weather/starvation related

[6] Birds were translocated to these 2 recruitment clusters for the first time in 2016

[7] Mean ("x") number of successful fledglings/PBG (e.g. in 2017, 13 fledglings/8 PBGs = 1.6)

[7] Mean ("x") number of successful fledglings/PBG (e.g. in 2017, 13 fledglings/8 PBGs = 1.6)

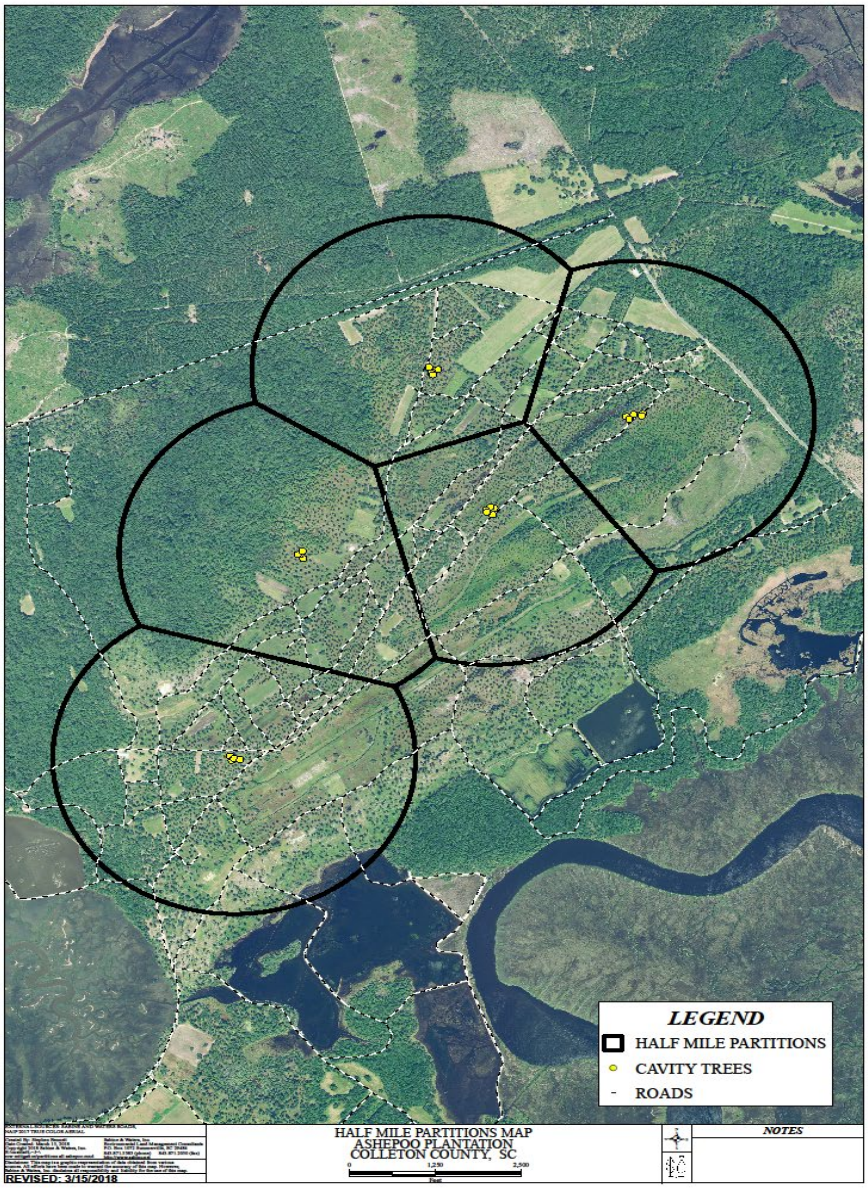



**Figure 6. RCW cavity trees and partitions at Ashepoo (Sabine & Waters, 2017)**

**Table 3. Ashepoo group status and fledgling production (Sabine & Waters, 2018)**

| Cluster # | Group Status* | | #Fledglings | |
|---|---|---|---|---|
| | 2016 | 2017 | 2016 | 2017 |
| 1 | PBG | PBG | 0 | 2 |
| 2 | PBG | PBG | 2 | 2 |
| 3 | U | PBG | 0 | 0 |
| 4 | PBG | PBG | 1 | 0 |
| 5 | U | U | 0 | 0 |
| Totals | 3 PBG | 4 PBG | | |
| | 2 U | 1 U | | |

*Status is determined the first spring (and all ensuing breeding seasons) post-translocation

[1] U = unoccupied cluster

[2] 3 eggs laid, nest failed prior to hatching

[3] 4 eggs laid, 1 nestling banded, gone at fledge check date

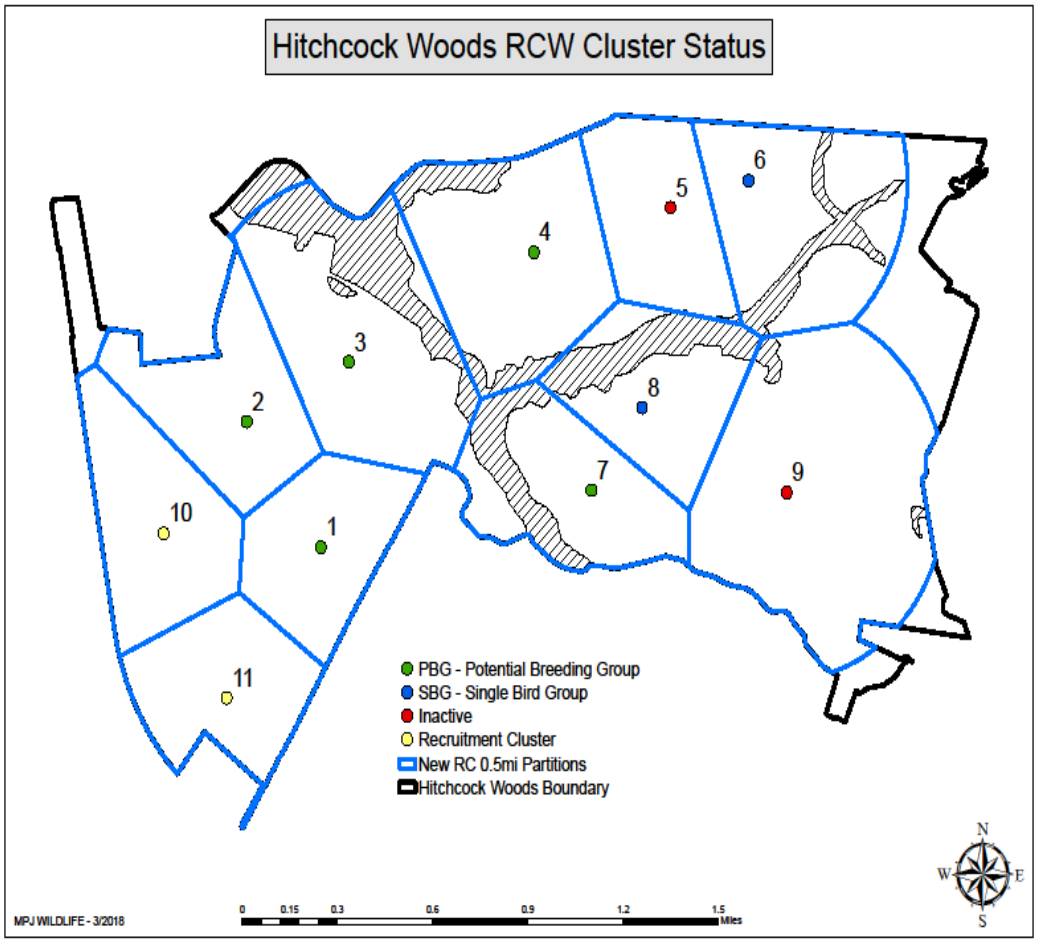



**Figure 7. RCW cavity trees and partitions at Hitchcock Woods (MPJ Wildlife, 2018)**

**Table 5: Hitchcock Woods group status and fledgling production 2017 (MPJ Wildlife, 2018)**

| Release Cluster# 2016 | Breeding Season Cluster # 2017 | Group Status* 2017 | # Fledglings 2017 |
|---|---|---|---|
| -- | 1 | SMU | 0 |
| 2 | 2 | U | 0 |
| 3 | 3 | PBG | 0 |
| 4 | 4 | PBG | 2 |
| 6 | 6 | U | 0 |
| 7 | 7 | PBG | 1 |

*Status is determined the first spring (and all ensuing breeding seasons) post-translocation

[1] A pair on unrelated subadults was released at each of these five recruitment clusters; nine clusters were available for release in 2016

[2] A pair of birds occupied Cluster #1 early in the breeding season in 2016

[3] Mean ("x") number of successful fledglings/PBG

### 4.1.5 Action Area Conservation Needs of and Threats to RCW

**Cainhoy/PHNS**

Private development and adverse land use threaten to remove suitable foraging habitat at Cainhoy Plantation. Loss of suitable habitat is the primary threat to the species. This includes a reduction in the number of cavities and cavity trees, a lack of quality foraging habitat, a reduction of fire-maintained management, and habitat fragmentation. These items will lead to the impacts of 11 baseline RCW groups and five above-baseline RCW groups. Beneficial management and compatible silviculture methods are essential to retain the remaining RCWs on Cainhoy Plantation, once the ITP has been issued.

**ACE Basin and Hitchcock Woods**

Loss of suitable foraging habitat, loss of cavities and cavity trees, and habitat fragmentation from lack of sufficient management threaten the RCW in new recruitment clusters. A lack of appropriate habitat management may also delay the success of these small populations to retain birds and establish PBGs. Small populations may also experience threats due to genetic stochasticity, demographic stochasticity, environmental stochasticity, and catastrophes. These reintroduced populations have specific management plans to promote the establishment of RCW populations on each of these sites and avoid previously recognized threats to the species. These are some, but not all, of the specific conservation measures and management plans for Ashepoo, Cheeha, and Hitchcock Woods:

a) Prescribed fire is a fundamental part of the longleaf pine management and will be used extensively on each property. Managed as quail plantations, Both Ashepoo and Cheeha have been under a 1-2 year prescribed fire return interval for decades. Hitchcock

Woods is proposing a fire return interval of 1-3 years to reduce hardwood encroachment and promote herbaceous groundcover;

b) The cavity management goal on Ashepoo and Cheeha will be to retain at least four suitable cavities for each cluster until the birds begin to excavate their own natural cavities. Hitchcock Woods has a similar protocol for cavity management with an extensive monitoring component; and
c) Broad predator management with an extensive monitoring plan is incorporated into each plan.

### 4.3 Effects of the Action on RCW

This section analyzes the direct and indirect effects of the Action on the RCW, which includes the direct and indirect effects of interrelated and interdependent actions. Direct effects are caused by the Action and occur at the same time and place. Indirect effects are caused by the Action, but are later in time and reasonably certain to occur. Our analyses are organized according to the description of the Action in section 2 of this BO.

#### 4.3.1 Effects of Residential and Commercial Development on the RCW

*Beneficial effects*

Since 2014, the Applicants have supported the translocation of RCWS to three separate properties within their historical range. These properties include Cheeha, Ashepoo, and Hitchcock Woods. The translocation success of these properties has been favorable (see Table 1, 2, and 3). Furthermore, evidence of dispersal between these recently occupied habitats suggests a demographic population of 22 PBGs within the ACE Basin. Cheeha, Ashepoo, and Donnelley WMA are within 6km from each other, designating a single demographic population.

Furthermore, due to forthcoming land use changes at Cainhoy Plantation, the SHA, which includes 11 baseline groups and 8 above-baseline groups, will become terminated once the ITP has been issued via the BO. However, the Applicants will retain the 19 RCW groups until such time that timbering operations are imminent for development activities. Provided that the Applicants will continue to provide appropriate habitat manage activities, the Service will then offer the Applicants "Safe Harbor-like Assurances" that no further regulatory obligations will be necessary if additional occupation by RCWs occurs on Cainhoy Plantation. This management should reflect those requirements as described in the original SHP Agreement, as administered by the SCDNR, in 1999.

In addition, the RCWs that have been retained at Cainhoy Plantation will eventually be translocated to other properties throughout the state of South Carolina as a salvage operation to further minimize the impacts. Once the RCWs are identified for translocation, the recipient properties will be identified by the Service and the SCDNR and may include Federal, State, or private properties. Because the Applicants do not yet have a schedule of events for the proposed Action, strict coordination between the Service, the SCDNR, and the Applicants is necessary. Three active RCWs clusters have been established on the PHNS and are not scheduled to be impacted by any timber or development activities. These clusters will be protected in perpetuity

under a conservation easement held by Lord Berkeley Conservation Trust. Continued prescribed fire, preservation, and maintenance of the upland longleaf pine ecosystem will benefit the long-term existence of the birds. These clusters will continue to provide recruitment to the greater FMNF population.

*Direct effects*

The proposed Action at Cainhoy Planation includes a master-planned, mixed-use residential and commercial development within the City of Charleston, Berkeley County, South Carolina. The Action as proposed will be developed in a phased construction manner over an extended period of time. Over the course of the 30-year permit, land clearing efforts and real estate development activities within occupied RCW habitat will result in the incidental take of 19 RCW PBGS (11 baseline groups and 8 above-baseline groups) due to habitat destruction.

The incremental conversion of longleaf pine habitat into a residential and commercial development will cause significant habitat degradation those results in the harm and harassment of 11 baseline groups of RCWs. The harm caused to RCWs will occur through habitat fragmentation, the loss of foraging habitat, the loss of cavity trees, and eventual destruction of 2,850-acres of contiguous old-growth longleaf pine forest. The Applicants propose to harvest the timber once development is imminent.

The translocation/augmentation and capture of the local population of RCWs at Cainhoy Plantation will directly result in the disturbance to adult, nestling, fledgling, and juvenile RCWs. This will occur due to the monitoring, banding, and trapping activity that is related to translocation activities once real estate development is imminent. Residential housing, commercial buildings, and infrastructure will be built over an extended period of time.
*Indirect effects*

Indirect effects of the Action include the reduction of future RCWs in the Cainhoy population available to replace breeding vacancies in the remaining Cainhoy RCW groups. This will increase their likelihood of extirpation prior to adverse impacts of timber harvests and loss of cavity trees and foraging habitat incidental to real estate development.

**4.4 Cumulative Effects**

Cumulative effects include the effects of future State, local, or private actions that are reasonably certain to occur in the action area considered in this BO. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA.

Specific management plans for the RCW have been developed for each of these properties in the ACE Basin and Hitchcock Woods. The management plans appear to be sufficient for the persistence of the species in these areas. In addition, Cheeha and Ashepoo are enrolled in the SHP and intend to increase their baseline once the ITP for the Action has been issued. This will continue to provide protection for these new recruitments.

In addition, the RCWs that have been retained at Cainhoy Plantation will eventually be translocated to other properties throughout the State of South Carolina as a salvage operation to further minimize impacts. Once the RCWs are identified for translocation, the recipient properties will be identified by the Service and the SCDNR and may include Federal, State, or private properties. Because the Applicants do not yet have a schedule of events for the proposed Action, stringent coordination between the Service, the SCDNR, and the Applicants is necessary.

### 4.5 Conclusion for the RCW

In this section, we summarize and interpret the findings of the previous sections for the RCW (status, baseline, effects, and cumulative effects) relative to the purpose of a BO under §7(a)(2) of the ESA, which is to determine whether a Federal action is likely to:

a) Jeopardize the continued existence of species listed as endangered or threatened; or
b) Result in the destruction or adverse modification of designated critical habitat.

"Jeopardize the continued existence" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR §402.02).

After reviewing the current status of the species, the environmental baseline for the Action Area, the effects of the Action and the cumulative effects, it is the Service's BO that the Action is not likely to jeopardize the continued existence of the RCW due to: the population of RCWs at Cainhoy Plantation is < 2% of the expanding Mid-Atlantic Coastal Plain Region Primary Core Population and the loss of the 11 baseline RCW groups will not significantly reduce the FMNF-Bonneau Ferry WMA-Santee Coastal Reserve WMA demographic population.

Take of RCWs will be minimized by implementation of the Reasonable and Prudent Measures, and Terms and Conditions outlined below. These measures have been shown to help minimize adverse impacts to RCWs.

After reviewing the current status of the species, the environmental baseline for the Action Area, the effects of the Action, and the cumulative effects, it is the Service's biological opinion that the Action is not likely to jeopardize the continued existence of the RCW.

## 5 INCIDENTAL TAKE STATEMENT

ESA §9(a)(1) and regulations issued under §4(d) prohibit the take of endangered and threatened fish and wildlife species without special exemption. The term "take" in the ESA means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (ESA §3). In regulations at 50 CFR §17.3, the Service further defines:

- "Harass" as "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering;"

- "Harm" as "an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering;" and
- "Incidental take" as "any taking otherwise prohibited, if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity."

Under the terms of ESA §7(b)(4) and §7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered prohibited, provided that such taking is in compliance with the terms and conditions of an incidental take statement (ITS).

For the exemption in ESA §7(o)(2) to apply to the Action considered in this BO, the Corps must undertake the non-discretionary measures described in this ITS, and these measures must become binding conditions of any permit, contract, or grant issued for implementing the Action.

The Corps has a continuing duty to regulate the activity covered by this ITS. The protective coverage of §7(o)(2) may lapse if the Corps fails to:

- Assume and implement the terms and conditions; or
- Require a permittee, contractor, or grantee to adhere to the terms and conditions of the ITS through enforceable terms that are added to the permit, contract, or grant document.

In order to monitor the impact of incidental take, the Corps must report the progress of the Action and its impact on the species to the Service as specified in this ITS.

Regulations issued under ESA §4(d) extend the prohibition under (a) above to threatened plant species (50 CFR §17.71). The damage or destruction of endangered and threatened plants that is incidental to (not the purpose of) an otherwise lawful activity is not prohibited.

### 5.1 Amount or Extent of Take

The Service anticipates that the Action is reasonably certain to cause incidental take of 11 groups RCWs consistent with the definition of harass resulting from capture and translocation activities. The Service anticipates that the Action is reasonably certain to cause incidental take of 11 groups of RCWs consistent with the definition of harm resulting from habitat destruction.

Incidental take is expected primarily in the form of harassment and/or harm in response to: 1) land clearing efforts and real estate development within RCW cluster partitions; 2) the activities associated with capture and translocation of the species. It is not possible to identify the specific clusters that will be affected by the timber harvesting and subsequent construction activities at this time due to the long-term development plans at Cainhoy Plantation. Effects of harm to RCWs is due to the loss of foraging habitat, the loss of cavity trees, and eventual destruction of habitat. Effects of harassment are due to translocation activities. Incidental take by harm and/or harassment by these activities is expected to adversely affect 11 active clusters.

## 5.2 Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures (RPMs) are necessary or appropriate to minimize the impact of incidental take caused by the Action on the listed wildlife species.

1. Implement a modified management strategy to supplement the long-term real estate development at Cainhoy Plantation.
2. Conduct periodic monitoring of remaining RCWs on the Property in anticipation of land clearing activities.
3. Notify the Service regarding land use alterations that may cause impacts to RCWs incidental to real estate development at Cainhoy Plantation.
4. Establish a Salvage-Translocation Plan for remaining RCW groups (baseline and above-baseline) prior to timber harvesting and real estate development.

## 5.3 Terms and Conditions

In order for the exemption from the take prohibitions of §9(a)(1) and of regulations issued under §4(d) of the ESA to apply to the Action, the Corps must comply with the terms and conditions (T&Cs) of this statement, provided below, which carry out the RPMs described in the previous section. These T&Cs are mandatory. As necessary and appropriate to fulfill this responsibility, the Corps must require any permittee, contractor, or grantee to implement these T&Cs through enforceable terms that are added to the permit, contract, or grant document.

1. Develop a management approach for remaining RCW habitat at Cainhoy Property. The Plan should include all methods used to manage habitat, including, but not limited to, use of prescribed fire, mechanical activity, herbicides, cavity management, and kleptoparasite control.
2. Periodic monitoring should be conducted to evaluate the RCW population at Cainhoy Plantation to assess partition size, number of active clusters, cluster status, and new cavity trees. Population monitoring will help qualify and evaluate future translocations.
3. Applicants should create a means of coordinating with the Service and the SCDNR to inform of upcoming timber harvesting that may cause adverse impacts to foraging habitat and cavity trees within RCW habitat. The Service and SCDNR should be notified 60 days ahead of any potential habitat impacts so new locations for RCWs may be located.
4. A strategy for the Salvage-Translocation effort should be established to develop a protocol and set of logistics for the translocation of RCWs with the Service and the SCDNR when the appropriate time is approaching. These translocations will occur on a case-by-case basis; however, a strategy is necessary for success.

## 5.4 Monitoring and Reporting Requirements

In order to monitor the impacts of incidental take, the Corps must report the progress of the Action and its impact on the species to the Service as specified in the incidental take statement (50 CFR §402.14(i)(3)). This section provides the specific instructions for such monitoring and reporting (M&R). As necessary and appropriate to fulfill this responsibility, the Corps must require any permittee, contractor, or grantee to accomplish the monitoring and reporting through

enforceable terms that are added to the permit, contract, or grant document. Such enforceable terms must include a requirement to immediately notify the Corps and the Service if the amount or extent of incidental take specified in this ITS is exceeded during Action implementation.

## 6 REINITIATION NOTICE

Formal consultation for the Action considered in this BO is concluded. Reinitiating consultation is required if the Corps retains discretionary involvement or control over the Action (or is authorized by law) when:

1. The amount or extent of incidental take is exceeded;
2. New information reveals that the Action may affect listed species or designated critical habitat in a manner or to an extent not considered in this BO;
3. The Action is modified in a manner that causes effects to listed species or designated critical habitat not considered in this BO; or
4. A new species is listed or critical habitat designated that the Action may affect.

In instances where the amount or extent of incidental take is exceeded, the Corps is required to immediately request a reinitiation of formal consultation.

## 7 LITERATURE CITED


Allen, D. H. 1991. Constructing artificial red-cockaded woodpecker cavities. USDA Forest Service General Technical Report SE-73.

Allen, D. H., K. E. Franzreb, and R. F. Escano. 1993. Efficacy of translocation strategies for red-cockaded woodpeckers. Wildlife Society Bulletin 21:155-159.

Beckett, T. 1971. A summary of red-cockaded woodpecker observations in South Carolina. Pp. 87-95 *in* R. L. Thompson, ed. Ecology and management of the red-cockaded woodpecker. U.S. Bureau of Sport Fishing and Wildlife and Tall Timbers Research Station, Tallahassee, FL.

Carrie, N.R., R.N. Conner, D.C. Rudolph, and D.K. Carrie. 1999. Reintroduction and post release movements of red-cockaded woodpecker groups in eastern Texas. Journal of Wildlife Management 63:824-832.

Conner, R.N. and B.A. Locke. 1982. Fungi and red-cockaded woodpecker cavity trees. Wilson Bulletin 94:64-70.

Conner, R.N. and K.A. O'Halloran. 1987. Cavity-tree selection by red-cockaded woodpeckers as related to growth dynamics of southern pines. Wilson Bulletin 99:398-412.

Conner, R.N., D.C. Rudolph, R.R. Schaefer, D. Saenz, and C.E. Schackelford. 1999. Relationships among red-cockaded woodpecker group density, nestling provisioning rates, and habitat. Wilson Bulletin 111:494-498.

Conner, R.N. and D.C. Rudolph. 1989. Red-cockaded woodpecker colony status and trends on the Angelina, Davy Crockett and Sabine National Forests. U.S. Department of Agriculture Forest Service Research Paper SO-250.

Conner, R.N. and D.C. Rudolph. 1991. Forest habitat loss, fragmentation, and red-cockaded woodpeckers. Wilson Bulletin 103:446-457.

Copeyon, C.K. 1990. A technique for constructing cavities for the red-cockaded woodpecker. Wildlife Society Bulletin 18:303-311.

Copeyon, C.K., J.R. Walters, and J.H. Carter, III. 1991. Induction of red-cockaded woodpecker group formation by artificial cavity construction. Journal of Wildlife Management 55:549- 556.

Costa, R. 1995. Red-cockaded woodpecker recovery and private lands: a conservation strategy responsive to the issues. Pp. 67-74 *in* D. L. Kulhavy, R. G. Hooper, and R. Costa, eds. Red-cockaded woodpecker: recovery, ecology and management. Center for Applied Studies in Forestry, Stephen F. Austin State University, Nacogdoches, TX.

Costa, R. and R. Escano. 1989. Red-cockaded woodpecker: status and management in the southern region in 1986. US Forest Service Technical Publication R8-TP12.

Costa, R. and E. Kennedy. 1994. Red-cockaded translocations 1989-1994: state of our knowledge. Pp. 74-81 *in* Proceedings of the American Zoo and Aquarium Association. Zoo Atlanta, Atlanta, GA

Crowder, L.B., J.A. Priddy, and J.R. Walters. 1998. Demographic isolation of red-cockaded woodpecker groups: a model analysis. USFWS Project Final Report. Duke University Marine Laboratory, Beaufort, NC, and Virginia Polytechnic Institute and State University, Blacksburg, VA

Daniels, S.J., J.A. Priddy, and J.R. Walters. 2000. Inbreeding in small populations of red cockaded woodpeckers: insights from a spatially-explicit individual-based model. Pp. 129- 147 *in* Young, A.G. and G. M. Clarke, eds. Genetics, demography and viability of fragmented populations. Cambridge University Press, London, UK.

DeLotelle, R.S. and R.J. Epting. 1992. Reproduction of the red-cockaded woodpecker in central Florida. Wilson Bulletin 104: 285-294.

Doerr, P.D., J.R. Walters, and J.H. Carter III. 1989. Reoccupation of abandoned clusters of cavity trees (colonies) by red-cockaded woodpeckers. Proceedings of the Arumal Conference of the Southeastern Association of Fish and Wildlife Agencies 43:326-336.

Emanuel, K. 2005. Increasing destructiveness of tropical cyclones over the past 30 years. Nature 436:686-688.

Franzreb, K.E. 1999. Factors that influence translocation success in the red-cockaded woodpecker. Wilson Bulletin 111:38-45.

Frost, C.C. 1993. Four centuries of changing landscape patterns in the longleaf pine ecosystem. Pages 17-44 *in* S.M. Hermann, ed. The Longleaf Pine Ecosystem: Ecology, Restoration, and Management. Tall Timbers Fire Ecology Conference Proceedings No. 18. Tall Timbers Research Station, Tallahassee, FL.

Gaines, G.D., K.E. Franzreb, D.H. Allen, K.S. Laves and W.L. Jarvis. 1995. Red-cockaded woodpecker management on the Savannah River Site: a management/research success story. Pp. 81-88 *in* D. L. Kulhavy, R. G. Hooper, and R. Costa, eds. Red-cockaded woodpecker: recovery, ecology and management. Center for Applied Studies in Forestry, Stephen F. Austin State University, Nacogdoches, TX.

Hess, C.A., and R. Costa. 1995. Augmentation from the Apalachicola National Forest: the development of a new management technique. Pp. 385-388 *in* D. L. Kulhavy, R.

Hooper, and R. Costa, eds. Red-cockaded woodpecker: recovery, ecology and management. Center for Applied Studies in Forestry, Stephen F. Austin State University, Nacogdoches, TX.

Hooper, R.G. 1983. Colony formation by red-cockaded woodpeckers: hypotheses and management implications. Pp. 72-77 *in* D. A. Wood, ed. Red-cockaded woodpecker

symposium II. Florida Game and Fresh Water Fish Commission, Tallahassee, FL

Lennartz, M.R., R.G. Hooper, and R.F. Harlow. 1987. Sociality and cooperative breeding of red-cockaded woodpeckers *(Picoides borealis).* Behavioural Ecology and Sociobiology 20:77-88.

Hooper, R.G., A.F. Robinson, Jr., and J.A. Jackson. 1980. The red-cockaded woodpecker: notes on life history and management. USDA Forest Service General Report SA-GR-9.

Intergovernmental Panel on Climate Change (IPCC). 2013. Summary for policymakers. Climate Change 2013: The Physical Science Basis Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge.

James, F.C. 1995. Status of the red-cockaded woodpecker in 1990 and prospect for recovery. Pages 439-451 *in* D.L. Kulhavy, R.G. Hooper, and R. Costa, eds. Red-cockaded Woodpecker: Recovery, Ecology, and Management. Stephen F. Austin State University, Nacogdoches, TX.

Koenig, W.D. 1988. On determination of viable population size in birds and mammals. Wild. Soc. Bull. 16: 230-234.

Lennartz, M.R. and R.F. Harlow. 1979. The role of parent and helper red-cockaded woodpeckers at the nest. Wilson Bulletin 91:331-335.

Lennartz, M.R. and D.G. Heckel. 1987. Population dynamics of a red-cockaded woodpecker population in Georgia Piedmont loblolly pine habitat. Pp. 48-55 *in* R.R. Odom, K. A. Riddleberger, and J.C. Ozier, eds. Proceedings of the third southeast nongame and endangered wildlife symposium. Georgia Department of Natural Resources, Game and Fish Division, Atlanta, GA.

Lennartz, M.R., R.G. Hooper, and R.F. Harlow. 1987. Sociality and cooperative breeding of red-cockaded woodpeckers *(Picoides borealis).* Behavioural Ecology and Sociobiology 20:77-88.

Letcher, B.H., J.A. Priddy, J.R. Walters, and L.B. Crowder. 1998. An individual-based, spatially explicit simulation model of the population dynamics of the endangered red cockaded woodpecker. Biological Conservation 86:1-14.

Ligon, J.D. 1970. Behavior and breeding biology of the red-cockaded woodpecker. Auk 87:255-278.

Rudolph, D.C., R.N. Conner, D.K. Carrie, and R.R. Schaefer. 1992. Experimental reintroduction of red-cockaded woodpeckers. Auk 109:914-916.

Schiegg, K., J.R. Walters, and J.A. Priddy. 2002. The consequences of disrupted dispersal in fragmented red-cockaded woodpecker (*Picoides borealis*) populations. Journal of

Animal Ecology 71:710-721.

U.S. Fish and Wildlife Service (Service. 2003. Revised recovery plan for the red-cockaded woodpecker *(Picoides borealis):* second revision. U. S. Fish and Wildlife Service, Atlanta, GA. 296 pp.

U.S. Fish and Wildlife Service. 2006. Red-cockaded woodpecker *(Picoides borealis),* 5-year review: summary and evaluation. Clemson Ecological Services Field Office, Clemson, SC.

U.S. Fish and Wildlife Service. 2009a. Rising to the challenge. Strategic plan for responding to accelerating climate change. Draft document. (http://www.USFWS.gov/home/climatechange/).

U.S. Fish and Wildlife Service. 2009b. Appendix: 5-year action plan for implementing the climate changes strategic plan. Draft document. (http://www.USFWS.gov/hom e/clima tecbange/).

Walters, J.R. 1990. Red-cockaded woodpeckers: a 'primitive' cooperative breeder. Pp. 69-101 *in* P. B. Stacey and W. D. Koenig, eds. Cooperative breeding in birds. Cambridge University Press, London, UK.

Walters, J.R., P.D. Doerr, and J.H. Carter, III. 1988. The cooperative breeding system of the red-cockaded woodpecker. Ethology 78:275-305.

Walters, J.R. 1991. Application of ecological principles to the management of endangered species: the case of the red-cockaded woodpecker. Annual Review of Ecology and Systematics 22:505-523.

Walters, J.R., C.K. Copeyon and J.H. Crowder. 1992. Delayed dispersal and reproduction as a life-history tactic in cooperative breeders: fitness calculations from red-cockaded woodpeckers. Amer. Nat. 139:623-643.

Watson, J.C., R.G. Hooper, D.L. Carlson, W.E. Taylor, and T.C. Milling. 1995. Restoration of the red-cockaded woodpecker population on the Francis Marion National Forest: three years post-Hugo. Pp. 172-182 *in* D. L. Kulhavy, R. G. Hooper, and R. Costa, eds. Red cockaded woodpecker: recovery, ecology and management. Center for Applied Studies in Forestry, Stephen F. Austin State University, Nacogdoches, TX.

Webster, P., G. Holland, J. Curry, and H.Chang. 2005. Changes in tropical cyclone number, duration, and intensity in a warming environment. Science 309:1844-1846.